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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/815,757	04/02/2004	Kouji Sumi	1089.0260003/ALF	9954
26111	7590	07/13/2006	EXAMINER	
STERNE, KESSLER, GOLDSTEIN & FOX PLLC 1100 NEW YORK AVENUE, N.W. WASHINGTON, DC 20005			TUGBANG, ANTHONY D	
			ART UNIT	PAPER NUMBER
			3729	

DATE MAILED: 07/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/815,757

Applicant(s)

SUMI ET AL.

Examiner

A. Dexter Tugbang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 April 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 18 and 20-27 is/are pending in the application.
- 4a) Of the above claim(s) 27 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 18-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☒ Certified copies of the priority documents have been received in Application No. 09/236,110.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4/24/06

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. The applicant(s) amendment filed on April 24, 2006 has been fully considered and made of record.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Election/Restrictions

3. Claim 27 continues to stand as being withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on November 4, 2005.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 18 and 20 through 26 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In Claim 18, the limitations of “depositing a thin...seed crystals” (lines 3-5) are new matter. With emphasis on the term of “separately” (line 4), the specification and drawings as originally filed, neither disclose, nor provide support for, how parts of a thin metal titanium film are deposited such that the parts would remain separately on crystal grain boundaries of the bottom metal layer. For example, the definition of separately or separate¹ can mean to be *kept apart*. How is it possible for parts of the thin titanium film to remain completely kept apart from one another on the crystal boundaries of the bottom metal layer?

Claim Rejections - 35 USC § 102

6. Claims 18 and 20, as best understood, are rejected under 35 U.S.C. 102(b) as being anticipated by the publication to Klee et al, titled “Analytic Study of the Growth of Polycrystalline Titanate Thin Films”.

Klee discloses a method of manufacturing a piezoelectric thin film component comprising: depositing a thin titanium (Ti) film (e.g. BaTiO₃ or SrTiO₃) on a bottom metal layer (e.g. bottom electrode of Pt), such that parts of the thin titanium film remain separately on crystal boundaries (see Fig. 5) of the bottom metal layer and form seed crystals; and forming a polycrystalline piezoelectric thin film on the bottom metal layer so that a perovskite crystalline lattice is grown from the seed crystals through various forms of annealing (all of which is discussed at p. 264 in the 2 paragraphs under the section of “Experiments”).

In response to the applicant(s) argument that the prior art does not teach “depositing...crystals” (lines 3-5 of Claim 18), this feature was relied upon in Klee et al. As best

¹ As taken from Webster’s Online Dictionary: <http://www.m-w.com/dictionary/separately>

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understood, Klee's Figures 5a-5c, shows parts of the thin titanium film (e.g. BaTiO₃ or SrTiO₃) being formed on the bottom metal layer *separately* on the crystal grain boundaries to the very same extent that the applicant(s) show parts of the thin titanium film (in applicant(s) Figs. 7 and 8) being formed on the bottom metal layer separately on the crystal grain boundaries. The comparison of Figures noted above between the applicant(s) and Klee's are strikingly similar.

Regarding Claim 20, Klee further teaches that the piezoelectric thin film is a (100) plane orientation (see p. 269) with a grain size of 0.3 μm (see p. 272).

Claim Rejections - 35 USC § 103

7. Claims 18, 20, 21, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paz de Araujo et al 6,056,994 in view of Klee et al.

Regarding Claims 18 and 21, Paz de Araujo discloses a method of manufacturing a piezoelectric component comprising: depositing a thin metal film on a bottom metal layer, or bottom electrode, such that parts of the thin metal film remain on crystal boundaries of the bottom metal layer and form seed crystals (P20 in Fig. 14); and forming a polycrystalline piezoelectric thin film on the bottom metal layer so that a perovskite crystalline lattice is grown from the seed crystals by:

forming a film of a sol composition having superlattice materials on the seed crystals, where the sol composition includes a high molecular organic compound mixed therein (see col. 5, line 64 to col. 6, line 59); heating the film of the sol composition at a temperature between 200° C and 600° C to gelatinize the film and to remove the organic compounds from the film thereby forming a porous gel thin film comprised of amorphous metal oxides (P23 in Fig. 14);

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baking the porous gel thin film at a temperature between 700° C to 800°C in a preannealing process until the gel thin film is uniformly crystallized and transformed into a crystalline metal oxide film (P24 in Fig. 14); repeating the above recited steps to laminate consecutive layers of a substantially integrated crystalline thin film (as indicated by the flowchart in Fig. 14); performing a final annealing of the above films such that perovskite crystal growth occurs and a polycrystalline piezoelectric thin film is formed on the bottom electrode (P30 in Fig. 14); and forming a top electrode on the formed piezoelectric thin film. In Figure 4, Paz de Araujo suggests the top and bottom electrode films 332, 328 with deposited films on a substrate 322.

Regarding Claims 22, Paz de Araujo further teaches seed crystals of titanium (see col. 6, line 31) and that the multitude of metal components themselves forming the piezoelectric or ferroelectric thin films are substantially maintained throughout the formation.

Paz de Araujo teaches substantially all of the limitations of the claimed manufacturing method except that parts of the thin titanium film remain separately on the crystal grain boundaries when deposited.

Klee, as best understood, shows depositing a thin titanium (Ti) film (e.g. BaTiO₃ or SrTiO₃) on a bottom metal layer (e.g. bottom electrode of Pt), such that parts of the thin titanium film remain separately on crystal boundaries (see Fig. 5) of the bottom metal layer and form seed crystals (in Figures 5a-5c) to advantageously achieve grain structures and certain electrical characteristics of the piezoelectric electronic device (see Abstract).

Further regarding Claim 20, Klee also teaches that the piezoelectric thin film is a (100) plane orientation (see p. 269) with a grain size of 0.3 μm (see p. 272).

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of Paz de Araujo by having parts of the thin titanium film remain separately on the crystal grain boundaries when deposited, as well as having the piezoelectric thin film in a (100) plane orientation (see p. 269) with a grain size of 0.3 μm , as taught by Klee, to positively achieve particular grain structures and electrical characteristics of the piezoelectric electronic device when manufacturing.

Regarding Claim 23, Paz de Araujo further teaches that the sol composition is comprised of a metal alkoxide and a main solvent (see col. 7, lines 24-33). However, it would have been an obvious matter of design choice to choose any desired specific composition of main solvent, since applicants have not disclosed that the claimed *2-n-butoxyethanol*, solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with the main solvent composition taught by Paz de Araujo.

8. Claims 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paz de Araujo et al in view of Klee et al as applied to claims 18, 21, 22 and 23 above, and further in view of Lipeles et al 4,963,390.

Paz de Araujo, as modified by Klee et al, teaches the claimed manufacturing method as previously discussed. The modified Paz de Araujo method does not teach a hydrolysis inhibitor added to the sol solution.

Lipeles suggests that a hydrolysis inhibitor added to the sol solution can be used to control the drying and affect the structure of the composition of the sol solution with the metal oxide (see col. 1, lines 50-58).

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to have improved the modified Paz de Araujo method by including a hydrolysis inhibitor, as taught by Lipeles, to positively control the drying of the sol composition with the metal oxide.

Regarding Claims 25 and 26, it would have been an obvious matter of design choice to choose any desired composition for the hydrolysis inhibitor and high molecular organic compound and sol mixture, since applicants have not disclosed that the specific claimed compositions for each (in claims 25 and 26), solve any stated problem or is for any particular purpose and it appears that the invention would perform equally well with the compositions taught by Paz de Araujo, Klee and Lipeles.

Response to Arguments

9. The applicant(s) arguments filed April 24, 2006 have been fully considered and met in view of the rejections set forth above.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after

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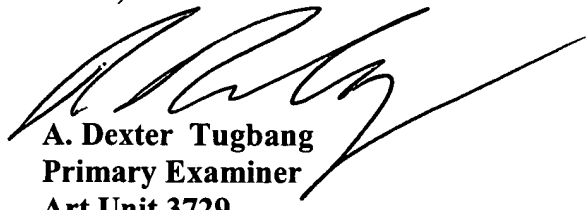
the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to A. Dexter Tugbang whose telephone number is 571-272-4570.

The examiner can normally be reached on Monday - Friday 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Vo can be reached on 571-272-4690. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


A. Dexter Tugbang
Primary Examiner
Art Unit 3729

July 10, 2006